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ABSTRACT

Advocating that Canadian art programs should use and model environmentally safe practices, the articles in this journal focus on issues of safe practices in art education. Articles are: (1) "What is WHMIS?"; (2) "Safety Precautions for Specific Art Processes"; (3) "Toxic Substances"; (4) "Using Clay, Glazes, and Kilns Safely in the Classroom" (Mary Daniels); (5) "Ventilation"; (6) "Safety Tips"; (7) "Liability"; (8) "Monoprinting on Plexiglass" (Wing Chow); (9) "Easy Stained Glass Work"; (10) "Non-Glaze Finishes for Clay" (Arlene Smith); (11) "Safety Symbols"; and (12) "Resources for Art Safety." (MM)

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Art Safety

British Columbia Art Teachers Association

Volume 31 Number 2 Fall 1991 Journal Editor: Sharon McCoubrey

BCATA, Provincial Specialist Association of the BCTF
105 - 2235 Burrard Street, Vancouver, B.C. V6J 3H9

ART SAFETY

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The BCATA Journal for Art Teachers is an official publication of the British Columbia Art Teachers' Association. The opinions expressed in the journal are those of the authors and do not necessarily reflect the views of the editors or the association.

ILLUSTRATION CREDITS

The image on the front cover of this journal is a monoprint made using the method described in this journal. It was created by Alex Miller, a teacher at Braemar Elementary School in North Vancouver.

The two monoprints that accompany that article were created by two Grade 12 art students, Layla Miller and Sarah McCoubrey, working with art teacher Rick Davidson at George Elliot Secondary School in Winfield, B.C., Central Okanagan School District.

The drawings that are presented throughout this journal were created by these students in S.D. 23, Central Okanagan:

Grade 4 students at Pearson Elementary with *Mr. Lon Brinton.*

Grade P2-P3 students at South Rutland with *Mrs. Marilyn Steinhauer.*

Grade P3 students at S. Rutland Elementary with *Mrs. Judi May.*

EDITOR'S VIEW

In 1981, the BCATA published a journal ART HAZARDS IN THE CLASSROOM. Now, 10 years later, we are issuing an update on that topic. There is new information available about safety, and new regulations, WMHIMS in particular,that relate to art education.
The 1981 journal was a very informative, helpful resource, some of its contents have been re-printed in this journal. A number of other resources have been particularly helpful in compiling this informaiton about Safety and Art, including the Worker's Compensation Board's publications and a valuable book, SAFETY IN THE ARTROOM, by Charles A. Qualley.

Our increased awareness of the environment's precarious situation should cause us to reconsider some of the practices and materials we have used in our art classes. Our art programs should use and model environmentally safe practices.

The information offered in this journal about safety is applicable to both elementary and secondary art programs.

Although it is important for a teacher to know what to do in the case of an accident or emergency, this journal is not intended as a first-aid guide. The information here will hopefully help us prevent accidents.

The sections of this journal will address the different hazards to be aware of, WHIMS regulations, various safety requirements, and some general guidelines that will promote safety. In addition, several lesson plans have been included to give examples of art activities that use alternatives to some hazardous art projects.

Reading about all the possible dangers of the materials we use when doing art could cause one to become alarmed. The intend is not to cause anxiety about art activities, but to provide the information needed for teachers to use a preventative approach to Art Safety.

Sharon McCoubrey, Editor

WHAT IS WHMIS?

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM

Sometime during the past several years, many teachers may have heard about or been involved in something called WHMIS. It is possible that our understanding of WHMIS and its implications for us as art teachers is still a little unclear. This brief summary is an attempt to clarify WHMIS by providing the basic details of the system. Further information should be sought as necessary.

The information given here is a summary of the small booklet entitled 'WHAT'S WHMIS?", 1990, published by Workers Compensation Board. I have extracted the information that relates most specifically to Art.

The purpose of WHMIS is to help reduce the likelihood of disease or injury in the workplace. There are three main players involved in WHMIS:

1. employee
2. employer
3. supplier.

There are three main requirements of WHMIS:

1. controlled product labelling
2. material safety data sheets
3. worker education and training programs.

These three requirements will be addressed individually with the responsibilities of the 3 players given each time.

CONTROLLED PRODUCT LABELLING

A controlled product is a substance or material that falls into one or more of the following classes or divisions.

CLASS A: COMPRESSED GAS
This class includes compressed gases, dissolved gases and gases liquified by compression or refridgeration. Examples: gas cylinders for oxyaceltylene welding or water disinfection.

CLASS B: FLAMMABLE AND COMBUSTIBLE MATERIAL.
Solids, liquids and gases capable of catching fire or exploding in the presence of a source of ignition. Examples: white phosphorus, acetone and butane. Flammable liquids such as acetone are more easily ignited than combustible liquids such as kerosene.

CLASS C: OXIDIZING MATERIAL
Materials which provide oxygen or similar substance and which increase the risk of fire if they come in contact with flammable or combustible materials. Examples: sodium hypochlorite, perchloric acid, inorganic peroxides.

CLASS D: POISONOUS AND INFECTIOUS MATERIALS

Division 1: Materials Causing Immediate and Serious Toxic Effects. This division covers materials which can cause the death of a person exposed to small amounts. Examples: sodium cyanide, hydrogen sulphide.

Division 2: Materials Causing Other Toxic Effects. This division covers materials which cause immediate skin or eye irritation as well as those which can cause long-term effects in a

person repeatedly exposed to small amounts. Examples acetone(irritant), asbestos (cancer causing), toluene diisocyanate (a sensitizing agent).

Division 3: Biohazardous Infectious Materials. This division applies to materials which contain harmful microorganisms. Examples: cultures or disgnostic specimens containing salmonella bacteria or the hepatitis B virus.

CLASS E: CORROSIVE MATERIAL
Caustic or acid materials which can destroy the skin or eat through metals. Examples: muriatic acid, lye.

CLASS F: DANGEROUSLY REACTIVE MATERIAL.
Products which can undergo dangerous reaction if subjected to heat, pressure, shock or allowed to contact water. Examples: plastic monomers such as butadiene and some cyanides.

Some materials are partially exempted from this list of controlled materials because they are covered by other labelling legislature. These products include: some consumer products, cosmetics and drugs, explosives, pesticides, radioactive substances.

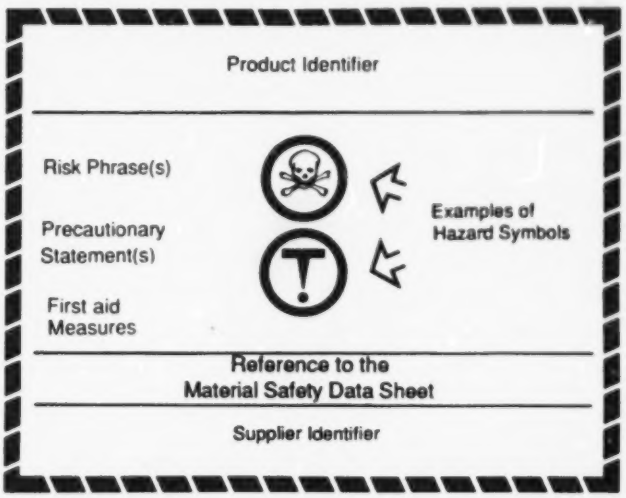
Some materials are completely exempted, such as wood and products made of wood, manufactured articles, tobacco and products made of tobacco, and goods handled, offered for transport or transported pursuant to the Transportation of Dangerous Goods Act.

THE SUPPLIER'S ROLE

The supplier must prepare and make available a supplier label, which will typically provide seven pieces of information:

1. product identification
2. hazard symbols representing the classes and divisions into which the product falls.
3. risk phrases
4. precautionary statements
5. first aid measures
6. a statement advising that a material safety data sheet (MSDS) is available.
7. supplier identification.

The supplier label must have a distinctive border, as shown in the example below, and must be in both official languages.



THE EMPLOYER'S ROLE

The employer is responsible for checking that supplier labels have been provided and applied to controlled products received at the workplace. Worders must be instructed in the information contained on labels and identifiers. The employer must take steps to ensure labels are not defaced and are easy to read at all times.

THE EMPLOYEE'S ROLE

Workers who work with controlled products will be expected to handle them in accordance with safe work procedures. In addition, they are to inform employers when the labels are illegible or have been accidently removed.

MATERIAL SAFETY DATA SHEETS

The MSDS, Material Safety Data Sheet, is a technical bulletin which provides detailed hazard, precautionary and emergency information on a controlled product.

All data sheets must provide nine sections of content:

1. product information
2. hazardous ingredients
3. physical data
4. fire and explosion hazard
5. reactivity data
6. toxicological properties (health effects)
7. preventive measures
8. first aid measures
9. preparation information (date of preparation and the name and phone number of persons or corporate departments to be contacted for additional information.)

No section of the data sheet can be left blank.
No data sheet may be more than three years old.

THE SUPPLIER'S ROLE

Suppliers must develop or obtain MSDS in both official languages for each controlled product they sell or import. Information must be current and prepared not more than three years before sale or importation.

A copy of the current material safety data sheet must be sent to the purchaser on or before the date of sale at the time of first purchase.

THE EMPLOYER'S ROLE

Employers must ensure that MSDS's are received for all controlled products supplied to the workplace. The employer must contact the supplier for an updated sheet when the data sheet at the workplace is three years old.

If the employer produces a controlled product for use at the workplace, the employer must develop an MSDS to accompany workplace labelling for it.

Copies of supplier and employer MSDS must be accessible to employees, close to their work areas and available during each workshift. Worker's must be educated in the content required on the data sheet and the applicable information in it.

WORKER EDUCATION

EMPLOYER'S ROLE

Employers will need to establish education and training programs for workers. The program of instruction will include:

1. education in how WHMIS works
2. training in procedures for the safe storage, handling, use and disposal of a controlled product, as well as procedures to be followed in case of an emergency with the product and when airborne or other emissions from the product are present.

Workers will need to be educated if they:

1. store, handle, use or dispose of a controlled product or supervise workers performing those duties

2. work near the controlled product such that their health and safety could be at risk during normal storage, handling use or disposal, during maintenance operations or in emergencies.

The objective of the program of instruction must be to ensure that workers are able to apply the information to protect their health and safety.

The program of instruction must be developed and implemented in consultation with the safety and health committee or representative. It must be reviewed at least once a year or more often if conditions at the workplace or information about the product changes the risk to workers.

WHMIS information is in the form of labelling and data sheets. Other workplace information includes a knowledge of the hazards of the workplace use of the product, which depends on factors such as quantities used, work processes and work location. For example, the hazards of spray painting inside a confined space are far different from hand brushing the same product in open air.

Workers must be educated in hazards and trained in work procedures. To implement WHMIS, the employer will need to:

1. Assign responsibility for program implementation.
2. Establish an inventory of controlled products.
3. Ensure that WHMIS labelling and Data Sheets are in Place by Compliance dates.
4. Determine the Hazards of controlled products in the workplace.
5. Establish Workplace controls, which may include:
   - -Engineering controls, such as ventilation, process modification and isolation of the source.
   - - Administrative controls such as work procedures, storage arrangements, maintenance and time scheduling.
   - - Personal protective equipment such as respirators, gloves and protective clothing.
6. Establish Emergency Procedures.
7. Provide Worker Education.
8. Review and Upgrade the program.

Many teachers may have taken part in some inservice about WHMIS, and therefore may already be well informed, however, anyone needing more specific information is encouraged to refer to the publications about WHMIS. A n y system, including WMHIS is effective only to the degree to which it is implemented and an accountability process is in place. As teachers, we can ensure that we do our part to follow WHMIS regulations for the sake of our own and our students' safety. ■

SAFETY PRECAUTIONS FOR SPECIFIC ART PROCEDURES

Much of the safety information that relates to art education is of a general nature and can be found in the various sections of this journal. These precautions should be adhered to at all times. Those hazards which are particular to specific art processes will be addressed here.

DRAWING

This is often thought of as a reasonably safe area of art education, but there are several concerns.

- Aerosol spray fixatives used on charcoal or pastel drawings must be used only in extremely well ventilated areas, and preferably outdoors.
- Charcoal and pastels can produce a dust when they are being worked that should not be inhaled.
- Use only water-based felt markers. Avoid permanent markers because they may contain toluene or other toxic solvents.
- Use only oil crayons that are non-toxic.
- Use a stump and not a finger to smudge or blend pastels. Some pigments are toxic and can be absorbed through the skin, or transferred from finger to mouth.
- Some inks may contain benezine dyes or black carbon contaminated with aromatic hydrocarbons, which are carcinogens. Use non-toxic inks and avoid contact with skin.

PAINTING

There are two main hazards associated with painting, the toxic pigments in the paint and the solvents used with oil paints. The pigments which are toxic inorganic and require extreme caution when handling include:

- Naples Yellow (Antimony) Cobalt Violet (Arsenic)
- All cadmium pigments (Cadmium)
- Chromium Oxide Green, Veridian, Chrome Yellow, Zinc Yellow, Strontium Yellow (Chromium)
- Cobalt Blue, Cobalt Green, Cobalt Yellow, Cerulean Blue, Cobalt Violet (Cobalt)
- Flake White, Naples Yellow, Chrome Yellow (Lead)
- Manganese Blue, Raw Umber, Burnt Umber, Mars Brown, Manganese Violet (Manganese)
- Vermillion, Cadmium Vermillion Red (Mercury)

Generally, these toxins cause irritation of the respiratory tract and the muccous membranes and are corrosive to the skin. Check with the Toxic Substances Chart in this journal to determine specific effects.

Even though the hazards of painting may seem extensive, a few precautions can make painting a safe art activity.

- Keep food away from the painting area.
- Maintain good housekeeping standards in the art room to prevent paint spills and residues.
- Never put paint brushes in the mouth.
- Wash hands carefully after painting.
- Use non-toxic paints.
- The danger associated with oil painting is mainly that of the turpentine and other toxic solvents used with the oils. This problem can be eliminated by not using oil paints. Acrylic, watercolour and tempera paints can provide the creative learning experiences that are aimed for in both elementary and secondary school art programs.
- Aerosol spray paints, finishes and fixatives are extremely hazardous because they contain organic solvents, fine particles of resins, paints or lacquer, and the mist is easily inhaled. In addition, the propellant may be an atmospheric pollutant. Avoid the use of spray paints.

PRINTMAKING

There are many different printmaking processes, each of which should be examined for safety concerns. However, using only water based printing inks will eliminate the greatest safety concern of all printmaking. This substitution may not be possible with all types of printmaking, however, for the objectives of elementary and secondary art programs, using only water based inks should be considered.

Oil based printing inks and the solvents required to work with them produce harmful vapours which must be ventilated; can cause skin problems; are flammable so they must be properly stored; and produce waste materials that require special disposal.

Other than using water based inks, several other general printmaking precautions include:

- Cutting tools used for carving potatoes, lino blocks, etc., can be dangerous. Use cutting tools that are carefully matched to the age, size and muscle control of the students. Plastic knives are a good substitute for metal knives for most cutting purposes.
- Cutting accidents may be eliminated by giving thorough, clear instructions, such as always cut away from your body.
- A cutting bench should be used when using metal cutting tools to carve lino or wood blocks.
- A block of wax is often a good substitute for lino or wood because it will hold a sharp line, but is much quicker and easier to cut.
- Wearing plastic gloves will prevent contact with toxic inks.
- Inked surfaces, brayer rollers, desk tops, etc. should be washed immediately since dried inks can form hazardous airborne dust and may be more difficult to remove.
- Hands should be carefully washed after printmaking.

FIBER ARTS

There are two main hazards associated with fiber arts projects, dust from the fiber, and the toxic ingredients of dyes.

- The dust in cloth and yarns or the fibers that are part of a particular material, such as burlap, hemp or wool, may cause respiratory or skin irritataions. Washing the material before handling may help eliminate these reactions.
- The dye may contain some ingredients as described in the Toxic Substances section of this journal. Many of the chemicals used with the dyes are mordants, or colour fixing agents, such as chrome, ammonia, or oxalic acid, which can cause respiratory and eye irritation, skin corrosion and allergies.
- Fiber-reactive (cold water) dyes seem to be the most hazardous causing symptoms such as asthma, fay fever, swollen eyes and severe allergy.
- Use an approved dust mask to avoid inhalation of the dye particles.
- Wear gloves to avoid exposure to the skin. Thoroughly wash any parts of the body on which the dye may have spilled.
- Avoid using powder form of the dyes. If possible, obtain dyes as a solution.
- The use of wax when doing batik can also be a hazard. Heated wax is highly inflammable. Never heat wax directly on a heat source, use only a double boiler set up where the wax is in a container of water, which is then on the heat sourse.

STAINED GLASS

Creating stained glass projects may not be a common art activity for students, but if it is worked with, there are several hazards to be aware of.

- Cutting the glass must be done with extreme care. Skill in cutting the glass without jagged edges must be developed.

- Goggles must be worn to protect the eyes from shards of glass that may fly when being cut.
- Keep the working area clean at all times to prevent slivers of glass causing cuts.
- Wash hands and finger nails carefully after working with the lead came.
- Good ventilation of the working area is necessary to remove the fumes that are given off by the solder.
- Glass etching paste contains hydrofluoric acid which is very corrosive to the skin, and irritating to the eyes and respiratory system. Precautions include the use of acid proof rubber gloves, clothing and goggles and shoes with acid proof soles, as well as an acceptable venting system or a respirator.

JEWELRY MAKING

The cutting, filing, casting, soldering or polishing that can be part of jewelry making have the potential for some safety problems.

- Wearing goggles during grinding and polishing is essential for safety.
- Sufficient ventilation is necessary for the fumes given off when soldering and for the fine particles caused when mixing the dry powder to make an investment mold for lost wax casting, and when breaking up the mold.
- Furnaces used for burn-out of wax, for enamelling, must be located near efficient ventilation.
- All machine guards must be in place when being operated for grinding or polishing.
- Be sure that long hair and sleeves are securely tied back to prevent tangling in the polishing wheel.
- Use only cadmium free silver solders and fluoride-free fluxes.
- Use lead-free enamels.

PHOTOGRAPHY

Photography has gained popularity as an art activity, however, because photography is totally a process of chemical manipulation, there are some hazards to be aware of and avoid.

- These chemical should be avoided in schools

DEVELOPERS

catechin, catechol, pyrocatechol, odihydroxybenzene, pyrogallic acid, pyrogallol, diaminopehol hydrochloride

INTENSIFIERS

mercuric chloride cercuric iodide potassium cyanide uranium nitrate

TONER

thiourea

MISCELLANEOUS

formaldehyde freons, fluorocharbons

- A darkroom must be sufficiently ventilated, determined by experts trained to work with ventilation requirements.
- Keep hands out of the chemcials. Use tongs or neoprene gloves.
- Have a skin and eye wash facility available in the darkroom to allow immediate flushing of chemical splashes.
- Keep all chemical baths covered when not in use.
- Do not allow sodium thiosulphate (fixer) to become old, since it may decompose to produce sulfur dioxide.
- Clean up all spills to prevent the dried dust from being a problem.

SCULPTURE

Three dimensional projects have endless possibilities and the materials involved could be almost anything. The precautions listed here will refer to some materials or tools that might typically be used when creating sculpture, but will certainly not cover all potential sculpture materials, therefore, investigate substance ingredients and procedures as necessary for this very broad art process.

- Use the necessary caution when handling cutting tools. Keeping cutting tools sharp will help prevent slipping and possible cuts.
- Use the appropriate tool for the job being done.
- Do not use rubber cement with students under 12 years old. It is highly flammable and contains volatile solvents such as hexane and other aromatic hydocarbons which are extremely hazardous when inhaled. A possible effect of hexane poisoning is distal axonapathy which involves gradual degeneration of axons, part of the nerve, of the arms, legs and selected parts of the central nervous system.
- Wallpaper paste often used for paper mache may contain rodent poison and toxic mercury perservatives. Use only those brands which are identified as non-toxic.
- Avoid any adhesive product that does not provide information as to its contents or toxicity.
- Plaster of paris dust can cause irritation of eyes and respiratory system and therefore must be used carefully, using a suitable dust mask when necessary.
- Heating styrofoam can release formaldehyde, carbon monoxide, cyanic acid from amino resins, phenol and styrene gas.
- Plastics are sometimes used for sculptural purposes, however, any process involving heating or dissolving plastics should absolutely not be done in school, the risks are too high.
- Wear necessary eye protection when carving or cutting wood.
- Asbestos can be a concern in some carving stones, try to obtain asbestos-free talc stone for carving. Vermiculite is sometimes added to other materials for carving purposes. It also contains asbestos.
- Metal forming may be part of a sculpture project for senior students. Welding and other processes of handling metals have inherent risks and must be undertaken only under the supervision of a fully trained adult.

COMPUTER GRAPHICS

Recent information from various sources, in particular from "The Magnetic Field Menace", by P. Brodeur, August 1990, has alerted us to a new hazard, that of the computer. Exposure to very low frequency radiation of the sort emitted by microcomputer video screen appears to be associated with three forms of cancer in children. This conclusion is being made mainly from the studies of children who developed leukemia, lymphoma or brain tumors after exposure to magnetic field from residential electrical power distribution systems. The strength of the current emitted by the power lines in these studies is similar to the strength of the same type of emission measured at a distance of twelve inches from a computer screen. The sides and backs of monitors emit even higher levels of radiation.

The risks of computer monitors to our students will depend upon the amount of time spent working at a computer. The precautions that can be taken at this time are relatively easy to implement. It is recommended that people sit at an arm's length, 28 inches, from the computer screen. If there are other computers in the room, children should sit at least four feet from the sides and backs of the other machines.

We must also be aware of new information and recommendations that will become available to us in the future as this relatively new risk is studied further.

A review of the precautions listed here may indicate that almost anything we do in the art room has potential risks and that our safest route to take might be to avoid it altogether. It is important to remember that the information given here is intended to inform you, allowing you to make wise decisions. Avoidance of highly toxic materials and common sense handling precautions can keep our children safe, but still involved in rewarding, creative art activities. ■

TOXIC SUBSTANCES

One of the greatest health hazards in the art room is toxic substances, those materials which could cause harm under certain circumstance. Toxic means "poison".

These harmful materials can get into our systems through:

- inhalation
- swallowing
- absorption through the skin.

Even when students or teachers do not intentionally eat art materials, accidental ingestion may happen as a substance travels from art tool to hand to mouth.

Some of the effects of exposure to toxic materials may be immediate. Other seemingly harmless substances may have an accumulative effect and the reactions may not show up for many years. Both possibilities must be guarded against.

Children are more susceptible than adults to toxic substances because their rapid metabolism causes their bodies to absorb toxic materials more quickly. However, teachers may be exposed to toxic materials more frequently and over a greater time period. Therefore, teachers and students alike can be endangered by misuse of toxic materials.

Being informed is the first step to avoiding health hazards from toxic substances. Awareness of those materials which pose a problem allows a teacher to decide how to eliminate the risk.

The second step to safety is to take action based on knowledge about the materials. Generally, risks from toxic materials can be eliminated or minimized by avoiding the substance and using a safe substitute, or using safe procedures, such as wearing protective equipment when handling the substances

We are very fortunate to be teaching art at this time. A few years ago, avoiding the use of a particular toxic substance might have meant compromising the quality of the art product. However, there are now many good quality, non-toxic materials that allow high quality results.

Some general guidelines for safety from toxic materials include:

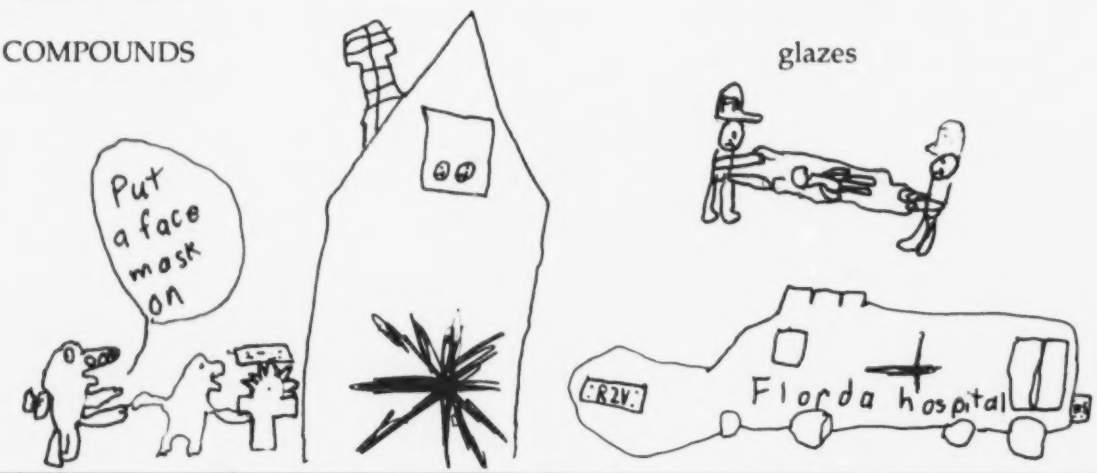
- Throw out old products. They may have deteriorated, or may contain dangerous materials that safety regulations would no longer allow. Old labels may not carry the necessary information to determine if a product is toxic or safe.
- Always look for, purchase, and use products which are labelled as non-toxic.
- Never use a product that is in an unlabeled container
- If it is necessary to transfer a product from one container to another, transfer the label as well. We may forget which material was put into the alternate container, or other individuals may use the materials.
- If you are in doubt about the content or toxicity of a product, don't use it.
- Teach and model safe practices for your students.

The following chart gives very brief information about some toxic substances that are often in art materials. This list may not be complete, there may be other toxic substances that require caution, or, the substance may be found in more products than the one listed. Therefore, it is wise to obtain more detailed information as required. The supplier or manufacturer of products will be able to give specific information.

The reaction to a toxic substance may vary among individuals and will depend upon the degree of exposure.

Hazard	Product
ARSENIC AND COMPOUNDS skin and digestive irritation dermatitis, cancer of the skin and lung, death	glazes
ACETONE central nervous system depressant irritation to eyes and skin	plastic laminates
ACETATES muccous membrane irritation and narcosis	paint, varnish
ANILINE cyanosis, bladder cancer	dye
BENZENE (BENZOL) muccous membrane irritation, aplastic anemia, leukemia	paint and varnish remover
BENZINE skin and muccous membrance irritant central nervous system depressant	paint and varnish remover
BENZIDINE cancer of the bladder	dye
BERYLLIUM skin irritation, severe progressive respiratory fibrosis, death	glazes
CADMIUM lung and kidney damage	paint, glazes
CARBON MONOZIDE headache, confusion, asphyzia coma and death	kiln firing
CHROMIUM AND COMPOUNDS dermatitis, lung cancer	pigment
ETHYLENE GLYCOL narcosis, kidney and brain damage	paint and lacquer
GASOLINE narcotic, skin and muccous membrane irritant, pneumonia	used as solvent
ISOCYANATE irritation of skin, eyes respiratory tract	paint

Hazard	Product
LEAD AND COMPOUNDS gastrointestinal upset, anemia neuritis, kidney damage	paint, glazes
METHYL ALCOHOL if ingested, intoxication, blindness and death	paint, varnish
METHYLENE DIANILINE liver damage	epoxy paint
METHYL HYDRATE headaches, nausea, eye irritation	
NICKEL dermatitis, cancer of lung nasal sinuses	glazes
SILICA silicosis	clay dust
SELENIUM AND COMPOUNDS	glazes
TOLUENE narcosis, skin irritant, central nervous system depresesant	paint solvent
TURPENTINE narcosis, muccous membrance irritant	
VARSOL central nervous system depressant skin and muccous membranes irritant	
XYLENE narcosis, skin irritant	paint, varnish
ZINC COMPOUNDS	glazes

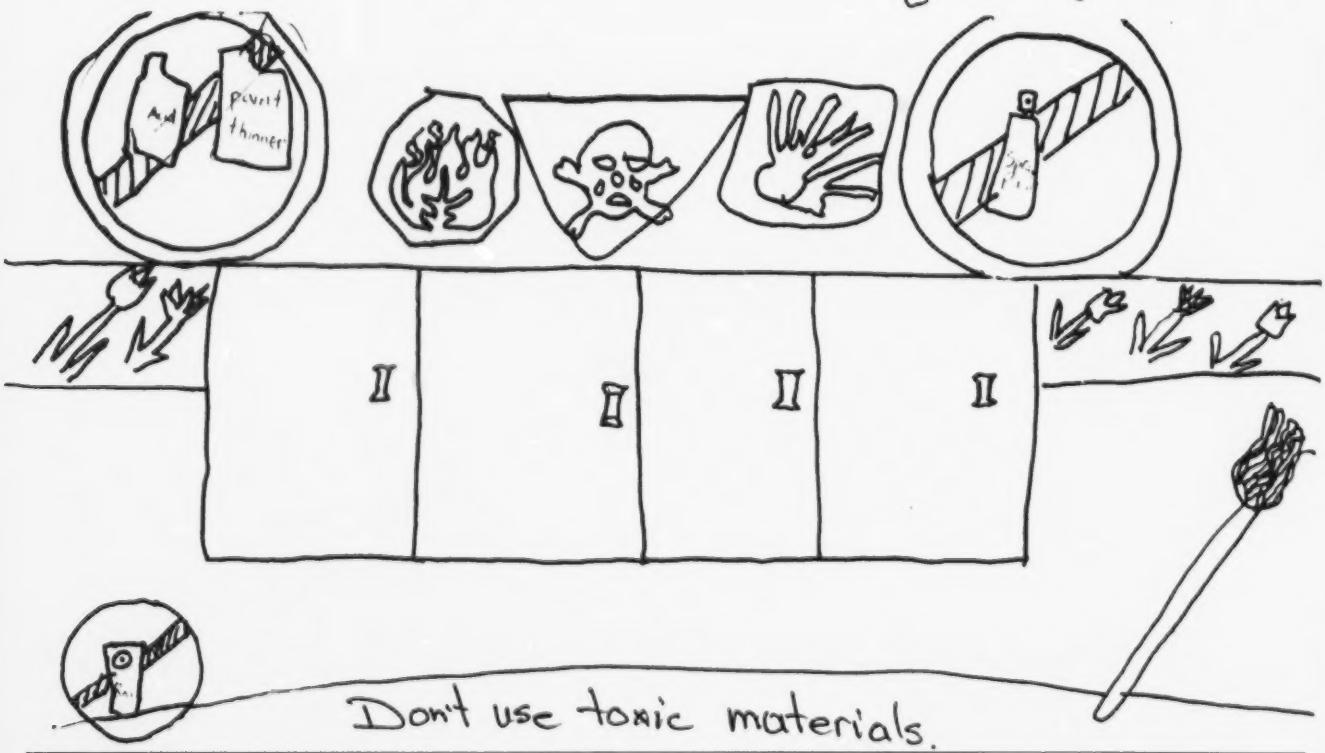


We often use materials that are produced in the United States, therefore, we should be aware of their labelling system on products. The Art and Craft Materials Institute administers the labelling of products. The labels that can be found on products are: CP Certified Product, and AP Approved Product, and HL Health Label. A material can earn these seals only if it contains no ingredient or known sensitizer that would produce an acute or chronic effect. The difference between CP and AP has to do with the quality of the material and not with toxicity.

The Art and Craft Materials Institute publishes lists of its members, as well as product lists to determine the certification status of a specific product.

These lists are available from:

The Art and Craft Materials Institute, Inc.
715 Boylston Street Boston, MA 02116
(617) 266-6800



USING CLAY, GLAZES, AND KILNS SAFELY IN THE CLASSROOM

by Mary Daniels

Many teachers are apprehensive about using clay in the classroom, but if you use the following guildines, clay may be used to help contribute to the school's dynamic art program.

Children under twelve are particularly susceptible physiologically to being exposed to toxic materials. Since their metablolism is rapid, and their body weight is lighter, they tend to absorb these materials easier and in a more concentrated fashion. There is also the consideration that even though younger children are told of the need for caution, they may not listen or understand the consequences.

The three main hazards when doing pottery occurs in these 3 stages:

1. MIXING - inhalation of silica dust
2. GLAZING - exposure to lead and other toxic substances
3. FIRING - heat, glare and toxic fumes.

However, working with clay can be a very safe activity when a few common-sense rules are followed.

MIXING
Use Wet Clay

All students benefit (as does the teacher in the classroom situation) when clay is in wet form. Clay contains silicates and continued exposure to dry clay particles suspended in the air can lead to silicosis and the symptoms may not manifest themselves for a number of years. While this is indeed harmful to students, it is also harmful to a teacher unless care is taken to use proper clean-up procedures.

- When students work with clay, it is advisable to have separate boards with canvas or burlap for the students to work with.
- Dampening the boards with a plant sprayer to keep dust down and washing the boards periodically will greatly reduce dust.
- Sponges and rags should be used to clean surfaces when working with clay.
- The school custodian is of course helpful when it comes to cleaning the floor surfaces, but we need to remember that clay and clay trimmings should not be allowed to accumulate on the floor. Try not to sweep the floor, a damp mop would help keep the dust down. If it does become particularly dusty, a vacuum cleaner should be used rather than a broom.
- Do not allow students to sand their clay work. A damp sponge will work well while the clay is leather hard.
- Students need to remember that they must wash their hands after working with clay and glazes.
- At no time should food or drinks be in the clay room.

GLAZING
Use Leadless Glazes or Non-Glaze Finishes

Many glaze ingredients are toxic. Refer to the section in this journal on toxic substances for more information on specific materials often used in ceramics. Those ingredients that may be in clay or glazes that require caution are:

silica	zinc
nickel	asbestos
lithium carbonate	barium carbonate
arsenic	uranium
cadmium	lead and its compounds
beryllium	selenium
chromate	

- Ready made glazes are marked as non-toxic and WHMIS reports give full outlines as to the concerns particular products might raise.
- The classroom teacher might wish to purchase a lead testing kit just to double check the lead content of products. They are inexpensive and easy to use. Student may also bring containers from home they are interested in testing.
- While making glazes, gloves should be used to avoid skin contact.
- A NIOSH approved (National Institute for Occupational Safety and Health) toxic dust respirator face mask should be used by the teacher and/or students when making glazes.
- Clean glaze container rims before closing to prevent a build-up of dried glaze.
- Wash brushes immediately after using them to apply glazes in order to avoid dust from dry glazes.
- Never have glaze ingredients or mixed glazes in containers that are not properly labeled. Always clearly label all containers, giving details of the contents of that container.

NON-GLAZE FINISHES

If teachers are not able to make their own glazes, or wish to avoid glaze ingredients, or consider commercial products too expensive, non-glaze finishes on bisque ware can be used. Two UBC students and teachers of elementary students, Louisa deTomaso and Arlene Smith researched some of the following materials that may be used safely and at a minimal cost. (see article on page ?)

All these surface finishing must be completed only after the clay work has been bisqued.

Materials that give colour.

1. organic substances such as instant coffee, tumeric, molasses, beets, kool-aid, etc. The colours do stay.
2. oil pastels, crayons
3. diluted liquid tempera paints
4. shoe polishes
5. diluted inks

Materials that give sheen:

1. white lepages glue, 2 parts glue, 1 part water
2. rhoplex or polymer
3. clear liquid floor wax

Application tools:

1. brushes
2. dampened small sponges
3. q-tips
4. spray bottles
5. small rags, etc.

FIRING
Fire the Kiln in a Well-Ventilated Area

- Ideally, the kiln should be located some where in the school other than the classroom.
- The kiln must be installed by a qualified electrician and must have good ventilation with a canopy hood that should be ventillated directly outdoors. If possible, open windows when the kiln is being fired.
- If a kiln is not correctly vented, some toxic gases such as carbon monoxide, sulfur dioxide, fluorine, chlorine, nitrogen oxides, and metallic fumes from glazes (produced by the heating of any metal above its melting point) could be given off. These gases can cause cardiac, respiratory and neurological problems.
- Although many schools do not like the kiln being fired overnight, talk with your administrator and school custodian concerning leaving the kiln on a low soak overnight to get rid of some of the fumes while there is no one in the room. It does not begin to be hot enought to present a danger and will enable a quicker firing the next day and a safer environment for the teacher and students.
- Remember to keep combustible materials away from the kiln, and to keep the lid firmly shut (locked, if possible with younger students) during firing.
- Wear protective gloves when working with a hot kiln in order to prevent skin burns.
- Do not look inside a kiln while it is firing without protecting your eyes from both the glare and from infrared radiation. Welding or infrared goggles should be worn with a shade rating between 1.7 and 3.0.
- Do not open the kiln until it is very cool. Handle only with kiln gloves made for the purpose of unloading ware.

The above information is just a beginning look at safety using clay and kilns, but will go a long way towards making the art classroom safe when using this wonderful material. For further information, consult the following sources or drop me a line and I'll try to answer as well as I can.

CHILDRENS' ART HAZARDS
Lauren Jacobson
The Natural Resources Defence Council, Inc. 1984

USING ART MATERIALS SAFELY,
A HANDBOOK FOR TEACHERS AND ADMINISTRATORS
Vancouver School Board, 1983

THE SAFER ARTS
Health and Welfare Canada, 1988

HEALTH HAZARDS MANUAL FOR ARTISTS
Michael McMann Nick Lyon Books, 1985 ISBN 0-941130-06-1

INDUSTRIAL HEALTH AND SAFETY REGULATIONS
Workers Compensation Board of B.C.

HANDS IN CLAY, An Introduction to Ceramics
Charlotte Speight Mayfield, 1989 ISBN 0-87-484848

CHILDREN, CLAY AND SCULPTURE
Topal, Cathy Weisinau, Davis, 1983 ISBN 0-87192-145-6 ■

Mary Daniels is a Ceramics Instructor in the Visual and Performing Arts in Education Department at UBC, and an accomplished and respected ceramic artist.

VENTILATION

"Ventilation is one of the most important health problems in schools." (Qualley, 1986, p. 4)

There are so many opportunities for contaminants to be floating in the air, then inhaled by teachers and students, the affects of which may not be immediately detected, but which may cause serious repiratory problems over time.

There are various ways to eliminate the hazards of inhaling dangerous substances, the most effective of which is to avoid the use of those materials that have a high toxicity. In those cases when the materials cannot be eliminated entirely, a ventilation system will help keep the air in the classroom clean.

When making decisions about the ventilation system to be used in your particular classroom or situation, it is important to consult a trained expert who is best able to determine the needs of a particular location and to design a system that will effectively work. Ventilation requirements may involve dilution ventilation, local exhaust ventilation, moveable exhaut systems, canopy or slot hoods, ducts, fans, spray hoods, and air cleaning devices. It is impossible in the space of this journal to include all information about all possible ventiation needs, therefore, the recommendation is repeated that a trained personnel be consulted.

There are resource materials available that will give much more detailed and specific information about ventilation that this section of this journal offers. One such source that would be a helpful reference is the book VENTILATION, A PRACTICAL GUIDE, by Nancy Clark, Thomas Cutter, Jean-Ann McGrane, 1984.

Defining several terms will help clarify some decisions that will need to be made concerning ventilation.

FUMES -a very fine particle resulting from the vapourization and then condensation of a solid, especially a metal.

VAPOUR -results from the evaporation of a liquid.

DUSTS -fine solid particles (powders)

MISTS -fine liquid droplets resulting from spraying operations

GASES -materials that are in gaseous state at normal temperature and pressure conditions.

The following guidelines will give some general information about ventilation, but it is also important to check with other sections in this journal to determine needs of specific art processes.

GENERAL VENTILATION GUIDELINES

- One of the first steps in solving ventilation problems is to identify the type of contaminant to be removed.
- Read labels and material data sheets to be aware of the contaminants of a particular product you may be handling.
- This guideline is so important it warrants repeating. Always substitute a toxic material with a non-toxic material.
- Ventilation requirements will vary according to the size and shape of the room, the number of the students and the concentration of hazardous fumes. Consultation with a ventilation specialist will result in a ventilation system that suits those particular needs.

- In many circumstances, simply opening a window is not a sufficient solution.
- Keep the room clean at all times as an easy and important way to prevent inhaling contaminants. This may include cleaning floors with a vaume cleaner or damp mop in order to prevent fine particles of contaminants from being stirred up and suspended in the air. Clean up spills immediately to prevent drying of toxic materials that could then be disturbed and mixed into the air.
- Consider which activities could or should be done outdoors.
- It is easier to ventilate a small space than a large one, therefore, carefully plan the location of a work area for a particular activity.
- Confine activities which generate fumes, gas, or dust to locations from which contaminants can be most easily extracted.
- Direct air away from the breathing zones of the people using the room.
- Avoid cross drafts.
- Avoid polluting the environment.
- Place the exhaust opening of the ventilation system as close as possible to the source of the contaminents.
- Supply make-up air to replace the air exhausted by the venting system.
- Do not have the ventilation system exhaust near the openings that draw in the replacement air.
- Most schools do not have an adequate local exhaust system for art activities that result in large amounts of contaminants being given off, such as solvent fumes in some printmaking processes. In such cases, keep that stage of the activity in an isolated location away from where the students are working. An open window and a fan in an isolated location will help move the toxins away.
- Consider the needs of the location of certain fume creating activities. For example, when soldering, set a vacume cleaner with its intake near the work so it will suck in the fumes, and place the exhaust hose to carry the fumes outdoors.
- Use a slot hood ventilation in a dark room at counter level.
- Ensure that fans and blowers are explosion proof and operate properly.
- Provide regular maintenance and cleaning of filter and fans to ensure proper air flow.
- Ensure that there is no recirculation of exhausted air.
- A ventilation engineer would design a ventilation system that would minimize the increased heating cost of venting replacement air during cold weather.

RESPIRATORS

Although the use of respirators does not replace a good ventilation system, there are times when using a respirator will increase safety precautions.

There are several types of respirators, including: air purifying respirator, supplied air respirator, self-contained breathing apparatus, dust mask, and surgical mask.

It is important to match the type of respirator to the type of contaminate being avoided. Some of these respirators are used more commonly in an industrial setting than in the art room. Dust mask and surgical masks will protect against nuisance dust, sawdust, plaster, etc., but will not protect against microscopic dust, chemical vapours, or solvents.

Use respirators that are NIOSH approved, (National Institute of Occupational Safety and Health).

- A good fit is important if a respirator is to be effective.
- Replace the filter as needed, and insure the filter correctly matches the respirator.

KILN FIRING

Only very brief information about ventilation requirements when firing a kiln will be given in this section, refer to the section USING CLAY, GLAZES AND KILNS SAFELY IN THE CLASSROOM in this journal for more extensive information.

Several reminders about kiln operation are:

- Ideally, a kiln should not be located in a classroom.
- Do not fire the kiln during school hours if the kiln is in the classroom.
- An open window is not sufficient ventilation when firing a kiln.
- A canopy hood over a kiln is necessary to collect the fumes as they are given off.
- The fumes and gases that are given off during a firing will vary according to the type of clay and glazes being used. Carbon monoxide is given off from the combustion of organic matter in the clay. Sulfur dioxide and nitrogen oxides and other gases may be given off from the glazes.

The efforts it may take initially to ensure that a proper ventilation system is in place for our art activities will be well worth it when measured against health and safety for students and teachers. ■

SAFETY TIPS

There are many things a teacher can do to ensure safety. In addition to the recommendations given in the other sections of this journal, the general safety tips given here should become a matter of habit for all art teachers.

Being informed is the first step to safety. It is a teacher's responsiblity to be informed. Only then can he/she make decisions that will ensure safety in the art room.

Students will come to us with little pre-knowledge about safety and at the same time, they trust us to keep them safe.

Know the risks involved in art. In the last few years, art education has broadened to include the use of materials and processes that were once reserved for industrial use.

Worker's Compensation Board has many regulations that exist to protect workers, the teachers. Our concern must also be for the students.

Teachers are at risk because they may have more frequent and longer term exposure to hazardous materials and situations.

Our challenge is to provide art experiences without injury or harm. It is important to be proactive about safety because we cannot afford not to be safe. A preventative approach should be our aim.

One of our goals must be to have the students learn about safety. What students learn about safety in school is what they will take with them when they leave school.

Teachers must model safe practices. Students will learn more effectively from our examples than from what we tell them or from safety posters.

Encourage the students to take some of the responsiblity for safety. Being directly involved will increase their awareness and understanding about safety. Some responsiblities they might assume are: serve on a safety committee, be a monitor, check labels and data sheets, create posters about safety, inform other students about safety. Be certain that students know what their responsibilities are concerning safety.

Daily lesson plans should include details of safety that pertain to that particular activity.

Teachers always need to ask the question: "Must I offer this particular activity in order to meet the objectives of the curriculum. Can another, less hazardous, project allow for the skill building and creativity that are essential to the art program." We must always judge and balance risk and educational value.

Always look for alternate options. Substitute non-toxic materials for toxic substance, and alter the processes of some activities to ensure safety. Classroom management will take us a long way toward safety, by reducing the possibilities of accidents and injuries.

Keep the classroom clean. Do not let dust, dirt or debris pile up; do not allow stacks of stuff to block walkways and work areas; do not allow piles of unkowns to accumulate in cupboards and corners. It is sometimes thought that tidiness and art do not go together, not so, it is a myth that a mess enhances creativity.

There should be adequate storage for all materials, supplies, tools and equipment that are part of an art program. The storage should be well organized and labelled, then maintained. Establish a good system that takes care of the logistics of an art activity, such as the distribution and collection of art materials, clean up, handling of equipment, placement of partially finished projects, disposal of wastes, etc.

Art teachers tend to be collectors of materials that might be used for future art projects. Keep these materials well organized, labelled, and kept to a reasonable amount.

Keep a complete inventory of all art materials and supplies that are in the classroom or school. Various forms for an inventory could be devised, but should include information about the kind of material, the amount on hand, where and how it is stored, hazard concerns, age, etc. Update the inventory annually. This inventory may seem like a very big job when it is first established, however, it is essential for safety, and if maintained on a regular basis, will be a big help when ordering supplies, and could cut costs by helping to avoid waste.

Be careful when storing flammable substances. Proper storage and handling are essential. The Flash Point of a substance is the temperature at which the liquid gives off enough vapour to form a mixture with air near the liquid's surface that will ignite when a flame or spark is near. The lower the flash point, the more flammable the liquid. Liquids that are considered flammable have a flash point below 100 F. They are combustible if their flash point is 100 - 140 F. Flash point temperatures should be part of the information that is made available about a substance on the label or data sheet.

Working with certain materials for an extended time may require further investigation to determine safety concerns. For example, wood is probably not a material used extensively in school art programs, but if a student chooses to work with it extensively, information about wood perservatives, types of wood, use of tools, etc., should be sought.

Use posters and signs in art rooms to remind students of the safety precautions of certain processes or materials.

Never put brushes or other tools in the mouth.

Keep all containers closed when not in use.

Waste disposal of paper towels or rags that have been used with flammable or combustible liquids or other toxic substances should be in an approved waste container, usually made of sheet metal with a cover that is designed to open only partially and automatically close.

Teach students to use tools and equipment correctly.

Prevent the wearing of clothing that could be dangerous in the art room, such as long loose sleeves, long hair, jewelry. Common sense will tell when a risk exists and how to solve the problem.

Use specialized safety equipment, such as eye goggles, gloves, face masks, etc., as needed. Specialized safety equipment should never be required in an elementary school because the choice of art projects should not involve that degree of risk.

Noise hazards are proablably not common in an art room, however, should a piece of machinery be used extensively or should there be any other source of noise at a dangerous level, use the necessary ear protection.

Establish a plan for dealing with injury and other first aid needs.

Be aware of those students with allergies, physical problems or other individual concerns. Some special needs students may require additional precautions in the art room because of their medical conditions or physical and mental capabilities.

Cooperation between teachers and administration is essential to ensure safety for the students. Each has certain responsibilities. One responsiblity for the teacher is to keep the administration informed about safety conditions and needs.

Keep current with safety issues. There are changes being made all the time: new materials on the market, updated information about products, new processes, tools, or combinations of substances, new regulations. Safety is possible only if teachers are informed. ■

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LIABILITY

A teacher being charged because of an injury or health problem from the art room is a real possibility.

Law suits seem to be more common practice now and settlements are significantly high, making the possibility of litigation over something that happened in the art room a matter of concern. Teachers should be aware of their vulnerability to legal action.

Parents expect school to be a safe place to send their children. Teachers are expected to give a greater standard of care than other adults the children might come in contact with. It is difficult to define what constitutes an adequate standard of care. Generally, elementary school students would require a greater standard of care than secondary school students because of the age and maturity difference.

The charge most likely to be brought against an art teacher would be negligence, based on the assumption that an accident would not have happened had safety precautions been put into place. The question that would be asked in a court case is "Did the injury occur because of something the teacher did or did not do."

Obviously, teachers will want to know what to do to prevent litigation against themselves. Prevention of accidents and health hazards is the wisest way to avoid possible legal charges. Following the safety guidelines presented in this journal will help prevent accidents and health problems.

Informing students of safety regulations and precautions is part of a teacher's responsibility. Don't assume that students already know safety precautions. When informing students about safety practices, to be legally binding, the rules must be written, concise, and communicated to the students.

If a teacher or an administrator is aware of a safety problem, they have a duty to correct it before an injury or health problem occurs. To not do so constitutes negligence.

Permission slips signed by parents do not waive liability of the teacher if negligence can be proven to have caused the accident or health problem.

"The increased incidence of adverse legal judgements against school districts, administrators and faculty members suggests a need for a clearly defined, ongoing course of action designed to reduce negligent liability for individuals directly and indirectly concerned with instruction or administration." (John Olson, 1981)

Establishing a policy and course of action must be done at the local level. It would be impossible to state all requirements of a policy in a universal way because within each jurisdiction the legal procedings vary, the roles of responsibility vary, and the specific situations, such as facilities, vary.

When schools and school districts work to establish policies and plans of action to ensure safety and to avoid negligence, the following steps to avoid litigation, offered by Charles Qualley in his book SAFETY IN THE ART ROOM, may be very helpful.

1. Insure that dangerous conditions have been eliminated.
   - Maintain the room in a safe manner with equipment properly located for safe use and be sure that hazards arising from the room itself are identified and eliminated.
   - Keep all equipment in good working order: sharp cutting edges, electrical cords in good conditions, proper kinds of protective gear available.

- Store materials and tools in appropriate containers and/or cabinets and clearly identify the contents.

2. Establish rules of behaviour and enforce them.
   - Make sure rules are clear, concise and understood.
   - Put rules in writing and either distribute them to the students or, if appropriate, post them in the area where the activities they govern take place.
   - Require responsible behaviour. Do not allow immature actions to go unchecked, and be sure all offenders are disciplined.
3. Formally test students' understanding of correct procedures.
   - Be sure students are carefully instructed in the correct use of all materials and equipment.
   - Develop and use tests to verify students have both knowledge and skills to participate in art activities.
   - Prohibit participation in activities unless the tests have been satisfactorily passed.
4. Maintain complete records of all inventory lists, condition reports, requests for elimination of room hazards, students tests, permission slips and information on allergies.
   - Keep lesson plan copies indicating that health and safety instruction was planned and actually provided in each class session.
   - Maintain a complete description of the artroom health and safety program, plans for using warning and information signs and copies of the constitution of student health and safety committees and minutes of any meetings."
     (Qualley, 1986, pp. 106 and 111).

Prevention is the best way to avoid legal complications with your art program. ■

MONOPRINTING ON PLEXIGLASS

by Wing Chow

This water based monoprinting project offers a satisfying and safe activity for self expression in any grade from K - 12. The materials are relatively easy to obtain and most secondary schools have etching presses on hand. This printmaking process is easy to complete in a short period of time, relative to other printmaking processes.

There are hazards inherent in most printmaking process, usually in the toxicity of the inks and solvents. The special qualities of the image, often achieved with printmaking, do not have to be sacrificed in order to be safe. The following printmaking project is safe, fast, and does offer vivid and sometimes unpredictable results.

MATERIALS

- plexiglass or acrylic plate (1/4 - 3/8" thick)*
- quality watercolour paints
- quality watercolour pencils
- quality watercolour felts
- gum arabic (pure 14 baume)
- cheesecloth or other rag, brushes
- printing paper
- sandpaper

* plexiglass is usually available at any glass shop, acrylic is often available from a window insulation company.

* gum arabic is readily available in most art supply stores at a cost of about $7.50. Windsor Newton is one possible supplier.

EQUIPMENT

etching press
plastic tray (for water)
hairdryer (optional)

PROCESS

1. Cut the plexiglass or acrylic to the desired size, up to the maximum size that the press bed can accommodate.

2. Roughen the plexiglass surface with coarse sandpaper.

3. Coat the plexiglass with a thin layer of the gum arabic using the cheesecloth or a brush. Let dry. This takes approximately 15 minutes. The hairdryer could be used to reduce the drying time.

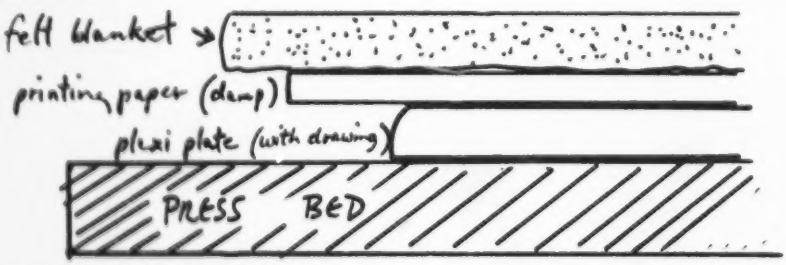
4. Using the paints, pencils or felts, draw or paint the image onto the arabic gum base on the plexiglass. As with any lesson, the image development preparation would be been taken care of before reaching this step in the process. The fact that plexiglass is transparent allows the students to work out ideas for the image, then place that image under the plexiglass.

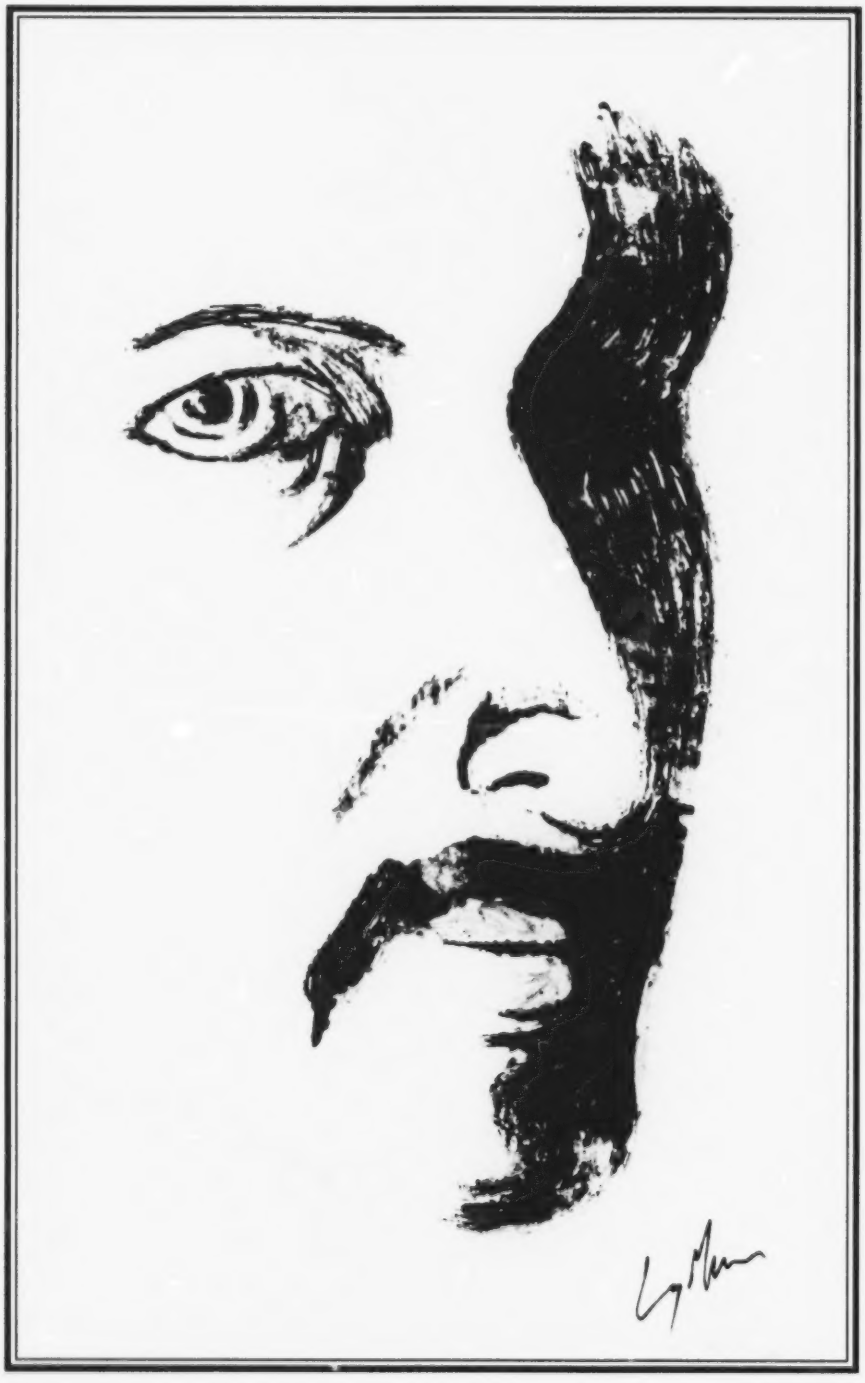
5. Place the painted/drawn plexiglass plate face up on the press bed.

6. Put dampened printmaking paper on top of the plexiglass plate. The moisture content of the printing paper will affect the blending of the colours that have been put onto the plexiglass.

7. Put the press blanket on top and run it all through the press.

Experimentation with this printmaking process will reveal the many possibilities and combinations that will lead to effective, innovative monoprints.





EASY STAINED GLASS WORK

Creating stain glass art works is a sophisticated art project that only rarely finds its way into school art programs. The hazards of handling glass and solder; the requirement of refined manipulation skills; and the expense of the required materials and tools, generally mean this project is restricted to a professional artist's studio.

The creative possibilities, the special visual qualities of the end product, the many different application of stained glass work, and the great variations of historical and contempory works make stained glass work a valid and valued part of an art program.

By eliminating the hazards and costs of professional stained glass work, the following project allows students to study, create and enjoy stained glass projects.

This project is suitable for elementary or secondary students, the complexity of the project and the image will vary with the age of the students.

MATERIALS

- clear plastic*
- food colouring
- white glue
- black tempera powder
- corn syrup

* The clear plastic could be overhead transparencies, clear tablecloth material cut into chosen pieces, or even laminating plastic.

EQUIPMENT

- scissors
- toothpicks or popcycle sticks
- squeeze bottle
- sandpaper

PROCEDURE

As with any art project, there must be the image development stage before following the process steps listed here. A study of stained glass works, historical or contemporary, and an element or principle of design emphasis would broaden the learning in this lesson.

1. Cut the clear plastic into a shape and size that will suit the end product, e.g. window, mobile, etc.

2. Create an image for the stained glass project. The image could be drawn onto a piece of paper that is the same size as the plastic sheet. That paper could be placed under the clear plastic, allowing the students to see their images as they proceed with the project.

2. Use a medium grade sandpaper to roughen the surface of the clear plastic. This allows the materials to stick to the plastic, rather then repelling.

3. Mix black powder tempera paint into the white glue. Put this mixture into a squeeze bottle that has a fairly small nozzle.

4. Using the black glue, trail the lines of the image onto the plastic. The glue lines will give the appearance of the lead outline in professional stained glass.

5. When all the lines of the image have been drawn with black glue, let the glue dry. This usually takes overnight.

6. When the glue is dry, complete the stained glass by filling in the shapes enclosed by the black glue with clear corn syrup, easily found in a grocery store. The syrup should be spread to completely cover the enclosed shape, and should be a fairly thin layer.

7. Drop food colouring onto the corn syrup. A single colour could be applied to one enclosed area, or several colours could be mixed in an enclosed shape by dropping a drop of each colour, then watch the colours flow and blend.

8. Allow the corn syrup to dry. This will take at least 24 hours, possible more depending on the thickness of the corn syrup.

9. When all materials on the plastic are dry, the clear plastic could be cut around the outside lines of the image.

10. For displaying purposes, the vivid colours and the transparent quality of the plastic and the corn syrup make this a great project to hang in the window of the classroom. Other dispay possibilities include hanging the projects as mobiles or placing them against a white background. ■

NON-GLAZE FINISHES FOR CLAY

by Arlene Smith

Safety is a concern in the art classroom. The B.C. Curriculum Guide specifically warns elementary teachers against using glazes that contain lead to finish clay pieces.

In addition to the safety issue is the concern about expenses and budgeting with regard to art education, lead-free glazes (frits) are quite expensive.

Both these concerns would lead us to find alternatives to glazes as a way to finish clay projects. The non-glaze techniques given here can be used to enhance, decorate and finish clay pieces. They must be used on clay bodies that have been bisque fired.

NON-GLAZE MATERIALS THAT GIVE COLOUR.

Whenever students engage in the application of colour to a clay surface, they should always be reminded that along with texture, shape, form, and line, colour is a very important 'design' element. Colour should always enhance rather than disguise or camoflage the fundamental ceramic form. The key word to remember when applying any colour at all is 'restraint'.

MATERIAL

1. oil pastels
2. torn tissue paper
3. liquid tempera paints.
4. acrylic paints
5. shoe polishes
6. wood stains
7. organic substances

fresh parsley	carrots
instant coffee	beets
black berries	turmeric
tomato sauce	molasses
grape juice	raspberry

8. oil-based model paints
9. india ink
10. ceramic stain

Decisions about the type of colouring material to be used will depend greatly upon the chosen desired effect. Wood stains, shoe polishes, oil pastels, organic substances would be a good choice if the clay piece has a textured surface using incising, base-relief, sgraffito, etc., and only if a slight 'wash' of colour is the preferred result. Oil-based model paints, liquid tempera and acrylic paints would be the likely choices if the clay pieces require opaque colour areas to give it decorative qualities. These materials work best when applied to a smooth clay surface.

NON-GLAZE MATERIALS THAT GIVE A SHEEN AND A PROTECTIVE SURFACE

1. clear shellac
2. white lepages glue (dilute with water 2-1)
3. clear liquid floor wax
4. rhoplex
5. glossy polymer
6. varathane

The above materials are used as final finishes on bisqued clay pieces that have already had a colourant applied to their surfaces. The objective behind the application of these finishes is basically two-fold. When finishes like these are applied as a top coat they act as a protection against

the wearing off of the colourant that has been used. Although they will not make the clay piece impermeable to water, they will make the piece somewhat water-resistant. As well, depending on the protective coating used, they will give the clay piece considerable shine. This sheen can be a very desirable finished affect to certain ceramic pieces. If more than one coat is applied it is important that the colourant has been allowed to dry thoroughly, and that additional protective coats have been allowed to dry between applications.

APPLICATION TOOLS

1. small sponges (dampened)
2. paint brushes
3. rags
4. fingers
5. Q-tips
6. spray bottles (non-aerosal).

It is important to think about the desired affect before an applicating tool is selected. If a great deal of control is required, brushes give the most desired affect. The other applicating tools that have been suggested here give other, very unique characteristics. It is important that the students have the opportunity to experiement so that they can determine which tool is best suited for the results they want to achieve. ■

Arlene Smith is a teacher in the Central Okanagan School District, Kelowna.

SAFETY SYMBOLS

Many different symbols that relate to safety have been assembled here to serve as a quick reference. More detailed information about the symbols and the required precautions may be found elsewhere in this journal.

These are the warning symbols that may appear on containers of hazardous materials.

FIRE

ELECTRICAL

COMPRESSED GAS

CAUSTIC

POISON

EXPLOSIVE

CORROSIVE

Slight variation of these symbols may be found that identify the TYPES of hazards.

The "skull and cross-bones" warns that the chemical is poisonous if taken into the body.

The "fire" symbol is a warning that the material is flammable or easily ignited.

The "exploding grenade" symbol indicates that the material can explode.

The "corroded hand" symbol indicates the material is corrosive to the skin.

The DEGREE of a hazard may be indicated by the shape of the symbol.

The 8-sided "stop sign" is a DANGER alert and is used with the most toxic materials.

The 4-sided diamond sign is a WARNING for a material that is moderately toxic.

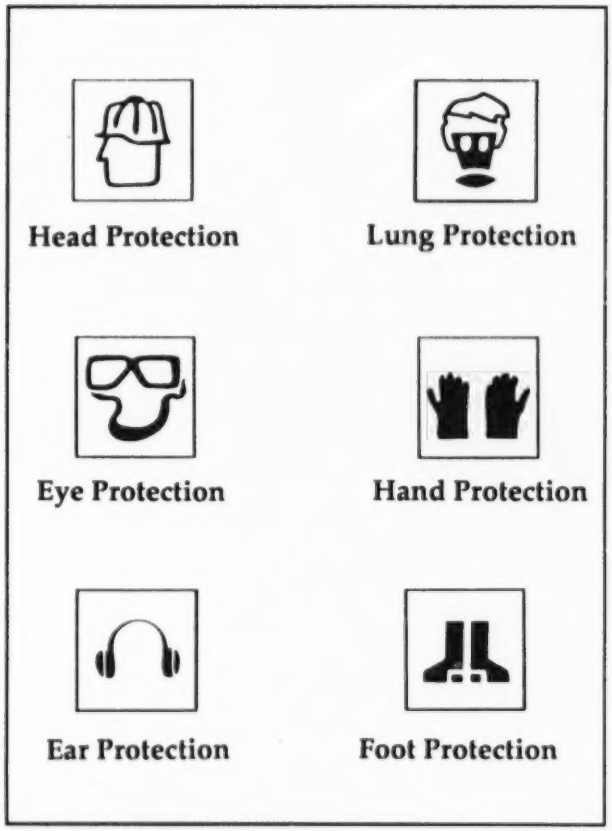
The 3-sided triangle sign is a CAUTION that the material is slightly toxic.

The shape and symbol may be used in combination.

	Danger	Warning	Caution
Poison			
Flammable			
Explosive			
Corrosive			

The product seals used by the **ART AND CRAFT MATERIALS INSTITUTE.**

Symbols identifying protective equipment.



WHMIS hazard classes and divisions for controlled product classification.

CLASS A:
COMPRESSED GAS

CLASS B:
FLAMMABLE AND
COMBUSTIBLE MATERIAL

CLASS C:
OXIDIZING MATERIAL

CLASS D:
POISONOUS AND
INFECTIOUS MATERIALS

DIVISION 1:
Materials Causing Immediate and Serious Toxic Effects.

DIVISION 2:
Materials Causing Other Toxic Effects.

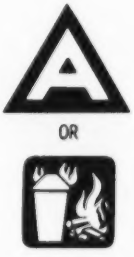
DIVISION 3:
Biohazardous Infectious Materials

CLASS E:
CORROSIVE MATERIAL

CLASS F:
DANGEROUSLY REACTIVE MATERIAL

Symbols that identify the four main classes of fires, which dictate the type of fire extinguisher to be used.

CLASS A: Fires involving ordinary combustibles, wood, cloth, paper etc. Fire extinguisher: the heat-absorbing (cooling) effects of certain chemicals that retard combustion.



CLASS B: Fires involving flammable or combustible vapours. Fire extinguisher: that prevent those vapours from being released or that interrupt the combustion.

CLASS C: Fires involving energized electrical equipment Fire extinguisher: nonconductive extinguishing agents

CLASS D: Fires involving certain combustible metals, such as magnesium, titanium, zirconium, sodium or potassium. Fire extinguisher: a heat-absorbing extinguishing medium that is non reactive with the burning material.

RESOURCES FOR ART SAFETY

This journal has used and referred to various resources for the information about Art Safety. More extensive information can be obtained from the resources listed here. They are listed in a random manner, and this list is by no means complete.

HEALTH HAZARDS IN ARTS AND CRAFTS
Canadian Centre for Occupational Health and Safety
250 Main Street East Hamilton, Ontario

HEALTH HAZARDS MANNUAL FOR ARTISTS
Michael McMann
Nick Lyons Books,
1985 ISBN 0 -941130-06-1

THE SAFER ARTS
Health and Welfare Canada, 1988

HAZARDOUS MATERIALS INFORMATION REVIEW COMMISSION
66 Slater Street, Suite 400 Ottawa, Ontario
K1A 0C9 Tel. 613 993-4331

SAFETY IN THE ARTROOM
Qualley, Charles
A. Davis Publications,
Inc.1986 Worcester, Massachusettes
ISBN 0-87192-174-X

ARTIST BEWARE
Michael McCann
Watson-Guptill
Publications, 1979 New York
ISBN 0-8230-0295-0

VENTILATION A PRACTICAL GUIDE
Nancy Clark, Thomas Cutter, Jean-Ann McGrane Centre for Occupational Hazards, Inc. 1984 New York ISBN 0-918875-00-5

SAFE PRACTICES IN THE ARTS AND CRAFTS: A STUDIO GUIDE
College Art Association
16E 52nd Street New York, N.Y. 10022

THE SILENT ENEMY:
POTENTIAL HEALTH HAZARDS IN THE ARTS AND THEIR CONTROL
Jerome Siedlicki
Artists Equity Association
2813 Albemarle St., N.W. Washington D.C. 20008

HEALTH HAZARDS IN THE ARTS AND CRAFTS
Bertram W. Carnow
Hazards in the Arts
Box 110, Route 1 Steuben, Wisconsin, 54657

CERAMICS HEALTH HAZARDS
Gail Coningsby Barazani
Center for Occuptational Hazards

ART HAZARDS NEWSLETTER
Published by: Center for Occuptational Hazards, Inc.
5 Beekman Street, New York, N.Y. 10038
Tel. 212 227-6220
10 newsletter per year Canadian Subscription cost, $17.00 per year

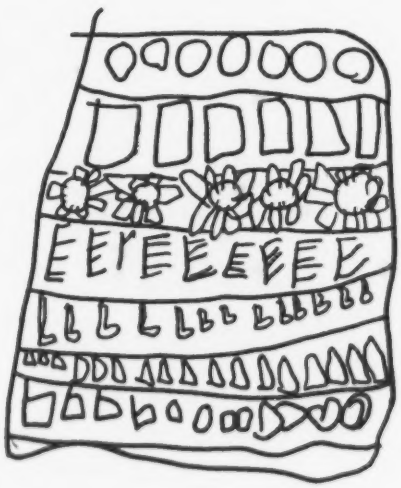
WORKERS' COMPENSATION BOARD OF B.C.
6951 Westminster Highway
Richmond, B.C.
V7C 1C6
Tel. 273-2266

FILM AND POSTERS SECTION WORKERS' COMPENSATION BOARD
Box 5350 Vancouver, B.C. V6B 5L5
Tel. 276-3068 1-800-972-9972 local 3068

THE CANADIAN CENTRE FOR
OCCUPATIONAL HEALTH AND SAFETY
250 Main Street East Hamilton, Ontario
V8N 1H6 Tel. 1-800-263-8276

CONSUMER AND CORPORATE AFFAIRS
PRODUCT SAFETY BRANCH
Ottawa, Ontario K1A 0C9 Tel. 613 997-1194

A PERSONAL RISK ASSESSMENT FOR
CRAFTSMEN AND ARTIST
College, University and School Safety
Council of Ontario
Workers' Compensation Board
80 Bloor Street
West Suite 604 Toronto, Ontario M5S 2V1
Tel. 927-4873



SAFER ARTS POSTERS

1. Pottery and Ceramics
2. Photography
3. Painting and Printmaking
4. Dyes and Fibers
5. Jewelry, Holloware, Enamelling
6. Glass-Blowing and Stained Glass
7. Wood 8. Sculpture
9. Metal Working

from the Health Protection Branch of the Department of National Health and Welfare.

Communication Directorate
5th Floor, Brooke Claxton Building
Holland Avenue, Tunney's Pasture Ottawa,
Ontario K1A 0L2
Tel. 613 957-2991